XXV. *On* Meliantheæ, *a new Natural Order, proposed and defined by* J. E. Planchon, *Docteur-ès-Sciences. Communicated by the Secretary.*

Read March 7th, 1848.

THE task of naturalists, in tracing out the affinities of beings, is not unlike that of putting together the many and various parts into which a picture has been purposely cut. If of these parts a great number are wanting, the difficulty of arranging the existing ones will be increased; groups will form themselves either isolated, or connected only by narrow links; and perhaps some parts, finding no immediate neighbour, will be forced into unnatural connexions. But in proportion as the missing pieces are collected, gaps will successively be filled and projecting angles find their corresponding sinuses; until at last, by the connexion of all its parts, the picture will assume its perfect integrity. Such would be the progress and such the end of systematical natural science, if, according to an ingenious suggestion of Linnæus with respect to plants, the juxtaposition of countries on a geographical map were a faithful pattern for the representation of the affinities which connect in one harmonious whole the innumerable objects of nature. Now, although such a disposition of natural tribes is but a degree of improvement over the imperfect linear series; although the outline of no group can be traced with mathematical precision; still every real advance in knowledge, every new object which is carefully compared with the mass of others, serves ultimately either to fill up intervening chasms, or to give a new direction to the outline of some group; or perhaps becomes itself the central nucleus around which parts, until then floating without determinate station, will gather themselves into one homogeneous mass. That such is the usual march of natural methods I need not to say in a place where the memory of Linnæus, although justly connected with the most ingenious of systems, is no less so with the happy and correct delineation of the groups which animate the vast picture of organized creation. The subject which I submit to the enlightened judgement of the Society naturally suggested the foregoing reflections, since it offers a striking example of the use which the natural method makes of new materials to improve (as I venture to hope) the arrangement of the old.

Melianthus, as defined by Linnæus and all subsequent authors, is one of those anomalous vegetable forms which puzzle the judgement of botanists by the very means which render them objects of eager and favourite inquiry. While the singular asymmetry of its flowers offers an interesting problem to morphological botany, its natural affinities have exercised, with more or less unsatisfactory results, the minds of the three great masters in that field of science, Adanson, Jussieu and Linnæus. By the first it is included in his family of *Gerania*, where are found besides the representatives of six different natural groups, namely *Malpighia* and *Banisteria* for *Malpighiaceæ*; *Cardiospermum* for *Sapindaceæ*; *Geranium* for *Geraniaceæ*; *Oxalis* for *Oxalideæ*; *Hermannia* and *Melochia* for *Büttneriaceæ*; *Viola* for *Violaceæ*; and also *Tropæolum,* which is there, I believe not unaptly, placed close to *Cardiospermum.* Fearing that a bare quotation of names might throw a shade of eccentricity upon that original and profound author, I must hasten to say, that he first and alone anticipated, with his usual perspicuity, the results which new materials enable me to consider as positive: he alone placed *Melianthus* between *Cardiospermum* and *Geranium.* The views of Linnæus upon the same subject will appear more fanciful and much less correct; since his order of *Corydales* exhibits the unexpected assemblage of *Melianthus, Monniera* (this last now well-known as a genus of *Diosmeæ*), of *Epimedium* and *Leontice* (*Berberideæ*), *Hypecoüm* and *Fumaria* (*Papaveraceæ*), *Impatiens* (*Balsamineæ*), *Utricularia* and *Pinguicula* (*Utricularieæ*), and *Calceolaria* (*Scrophularinæ*), the last marked with a well-deserved and very significant (?). Lest I should appear to quote these opinions as matter of criticism, I must refer my readers to the delightful work* from which they are extracted; and there, under the title of that very same order, they will find that a mixture of erroneous data and of deceitful but ingenious analogies prevailed in this case, in the acute mind of the author of the 'Philosophia Botanica.' On the other hand, A. Laur. de Jussieu, whose wonderful aptitude for detecting natural affinities borders somewhat on divination,—Jussieu himself failed to seize those of *Melianthus,* which in his 'Genera' ranks as an appendage to his dimorphous order of *Rutaceæ,* and is more particularly compared with *Dictamnus* on one side, and *Tropæolum* (one of his *Geraniaceæ*) on the other. More recently, in his excellent monograph of *Rutaceæ,* M. Adr. de Jussieu, illustrating by accurate figures the structure of the flowers of *Melianthus,* refers again to the analogy of that genus with *Tropæolum*; while however he places it as a *genus affine* at the end of the group of *Zygophylleæ,* which he, following his illustrious father, considers as a mere section of *Rutaceæ,* but which Mr. Robert Brown had already distinguished as an independent order. To that view of the affinities of *Melianthus* subsequent authors have either implicitly or positively acceded; with the exception of M. Reichenbach, who, perhaps better inspired by Chance, the deity who must have presided over his vast bird's-eye view of the vegetable kingdom, has revived the idea of Adanson as to the immediate connexion of *Melianthus* with *Sapindaceæ.*

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* Prælect. in Ord. Nat. Pl. (ed. Gisecke), p. 371, *et seq.*

After these too long but unavoidable details, I proceed to take up the question anew, by a sketch of the striking features of those plants which I consider to be the real types of *Melianthus*; that is to say, *Melianthus major,* L., a well-known Cape species, and *M. Himalayanus,* Wall., a truly unexpected member of the flora of Northern India. All these are shrubs, with simple and half-herbaceous stems, large pinnate leaves of a glaucous hue, and long terminal racemes of dull reddish flowers, which spring singly from the axils of coloured bracteæ. A strong fœtid and virous smell of all the parts, the widely-winged petiole, deeply serrated folioles, large intrapetiolar stipule (made up of the connexion of two), the abundance of the honeyed liquor of the flowers,—all these points are highly characteristic of the genus. The flowers themselves, if seen at and long before the time of their expansion, appear under a deceitful attitude; since by the early torsion of their pedicels, they present downwards, as regards the general direction of the erect raceme, that side which normally and actually in the young bud is turned upwards, or lies close to the rachis. Hence that which by all authors has been described as *posticum* or *superum,* must be understood as *anticum* or *inferum,* and *vice versâ.* According to this view, each flower exhibits the following structure: —A large coloured calyx, with a depressed and somewhat triangular base, compressed on its sides, and deeply cut into five unequal segments. Of these, the two larger are in fact inferior, but in appearance superior in the expanded flower; then follow two lateral ones, narrower and shorter than the first; and lastly, on the posterior (in appearance anterior) angle of the base of the flower appears the fifth segment, which, much shorter than the rest, is not unlike a Phrygian cap, or rather a cowl, with its wide and oblique aperture turned towards the inside of the flower, and its apex generally tapering into a short pendent spur. Out of this concave sepal seem hardly to emerge four of the comparatively small petals, which are inserted around a large horseshoe-shaped concave gland filling almost all the upper (apparently lower) half of the receptacle. Although the claws of those petals are all converging, and even connected together towards their apex by means of the woolly indumentum of their margins, their bases of insertion are however, according to rule, alternate with the corresponding sepals; that is to say, the two superior (apparently inferior) petals are inserted each between the cowl-like sepal and the adjacent lateral one; the two other (lateral) petals each between one of the lateral narrower sepals and the adjacent anterior (but apparently posterior) one. In addition, an artificial expansion of those two inferior larger sepals will show, alternating with them, a small imperfect fifth petal, generally reduced to a thick linear unguis, with or without a rudiment of a lamina. The alternation of the five petals with the calycine segments being thus successfully ascertained, let us turn now to the more internal organs. The large gland already noticed, and which is evidently an incomplete disc, fills a broad interval between the two posterior (apparently anterior) petals and the two posterior stamens. Hence the position of the fertile organs of the flower is remarkably eccentric, and their insertion nearer to the anterior sepals than to the posterior cowl-shaped one. They consist of a four-celled ovarium and of four slightly didynamous stamens, which, like the style, are gently turned backwards (apparently forwards in the expanded and inverted flower). Of these, the two anterior (apparently posterior) are free and opposite to the larger sepals; while the small abortive petal alternates with them. The two others, more or less connected at their base, are in fact, although less evidently, alternate each with two of the connected petals. To arrive then at a perfect symmetry of the flower one stamen only is required, and that, if developed, would be the posterior one which should alternate with the two posterior petals, and of course be intermediate between the two posterior and connate stamens. Now the position thus theoretically assigned to the wanting stamen is almost practically ascertained by the fact of a small tooth or short filament being found in the place just mentioned. To sum up then, the structure, apparently so anomalous, of the flowers of *Melianthus,* we may use the following formula:—" Calyx deeply cut into five unequal segments. Posterior segment cowl-shaped, short; anterior ones large, ovate-oblong; lateral ones broadly-linear, shorter than the anterior. Petals five, comparatively small, alternate with the calycine segments; inferior one more or less abortive, distant from the others; lateral and posterior ones converging towards the cowl-like sepal and connected together by the woolly margins of the apex of their claws. Disc incomplete, horseshoe-shaped, and at the same time concave, with its aperture turned towards the ovarium and the inferior (apparently superior) side of the flower, interposed between the two posterior stamens and the two posterior petals. Stamens (normally 5) hypogynous, alternate with the petals: the posterior one always abortive, occasionally represented by a short sterile filament; the inferior ones free, the intermediate or lateral ones more or less connected at their base. Ovarium four-celled, its cells alternating with the stamens." If to these floral characters we add an awl-shaped style, with four small stigmatic toothlets; four ovules inserted in two rows above the middle of the internal angle of each cell; a membranaceous, inflated, almost tetrapterous, four-lobed capsule, the carpels of which open along the obliquely-internal suture of their superior lobe; and lastly several seeds (generally two in each carpel), horizontal or ascending, anatropous, with a hard shining testa, a large somewhat horny albumen, a narrow, straight embryo with a claviform radicula longer than the plano-convex cotyledons;—in recapitulating, I say, all these characters and combining them with those of general habit, vegetation, foliation and properties already mentioned, we shall have a comprehensive idea of the leading features of *Melianthus,*—a sketch sufficient at least to guide us in the search of the affinities of that singular genus.

Thus, if we find shrubby plants with pinnate leaves, winged, or at least marginated petioles, intrapetiolar and connate stipules, simple racemes, and flowers bearing the strictest analogy to the normal or usual structure of those of *Melianthus,* we shall be inclined to take so striking a conformity as a sign of some close connexion; and perhaps the very conflicting points, which are distinctive generic marks of the plants under consideration, will throw a new and unexpected light upon their general as well as mutual affinities.

The plants I have been just alluding to are no ideal types, but two remarkable genera lately discovered in several parts of tropical and subtropical Africa, one of them, *Natalia,* Hochst., being represented by one species in Port Natal, on the coast of Cafferland, and by another species in Sierra Leone; while the two known species of *Bersama,* Fresen. (the second genus), seem to be confined within the limits of the Abyssinian flora. Both genera agree in their habit and structure to such a degree as to leave no doubt of their being rightly approximated by M. Hochstetter, although M. Endlicher, probably through a pardonable inadvertence, leaves *Bersama* among *Ampelideæ,* whose characters are totally at variance with it; while, at the suggestion of M. Hochstetter, he assigns to *Natalia* a place among *Sapindaceæ.* On the other hand, M. Ach. Richard, who in his 'Tentamen Floræ Abyssiniæ' has recently given a correct figure of *Bersama,* seems to make no doubt of its being a true *Meliacea*; although the position of the disc, outside instead of inside of the stamens, would suffice to exclude the genus from that very clearly defined order, and point out its affinity to *Sapindaceæ.* But if *Natalia* and *Bersama* are in fact closely allied to this last group, it is no less certain that they do not come within its limits: for the want of albumen, and the greater or less curvature of the embryo, are characters of primary, and one may say, necessary importance in *Sapindaceæ*; and, contrary to this, *Bersama* and *Natalia* have like *Melianthus* a narrow, straight embryo in the axis of a copious albumen.

But, to revert to the analogies or differences between those plants and *Melianthus,* let us take a short notice of the flower of *Natalia.* There the calyx is comparatively small, and its irregularity not very striking. However the two inferior of its five segments are connected into one, with only a slight emarginature to mark their limits. Five unguiculate and thick petals alternate with the calycine segments, above which their nearly uniform borders are almost equally spread. But a closer examination shows that the lower petal, corresponding to the emarginate apex of the double calycine segment, is in fact narrower than the rest, and represents a kind of labellum, analogous by its position to the small abortive petal of *Melianthus major*. A somewhat hippocrepiform gland embraces the base of the back of the two posterior stamens, which are half connected together, while the other two are free; the whole of the andræcium and disc being thus the very image of the corresponding parts in *Melianthus*. In both, the quaternary number of the stamens is in strong contrast with the quinary proportion of the petals and calycine segments; the disc is in both incomplete and excentric, opposite to the posterior stamens, and placed outside of their filaments, the vacant place of the fifth not developed stamen being opposite to the posterior sepal; so that, when we come to *Bersama*, where the quinary proportion and the regular alternation of all the verticils of the floral parts is a constant and usual character, we find there exemplified, by a living demonstration, what the laws of symmetry led us to conceive of the normal state of the flower of *Natalia* and *Melianthus*.

What has been said of the three genera in question will perhaps appear sufficient to justify their combination into one natural order, to which the name of *Meliantheæ* may be applied. It remains still to point out the distinctive marks which, according to their importance, may be deemed either of generic or of sectional value in these plants. A large, coloured, remarkably irregular calyx; four of the petals in part connected by their claws; the stigmatic toothlets of the style very small; a capsule of a papyraceous texture; two ovules at least, and sometimes four or six in each cell; and seeds destitute of arillus;—these are the characteristic features which distinguish the section of *Eumeliantheæ* or *Meliantheæ* proper; while the slighter irregularity of the flowers, the free petals, thick stigmatic lobes, coriaceous capsule, solitary ascending ovules, and arillate seeds will obviously define the section of *Bersameæ*, including *Bersama* and *Natalia*.

As to the less important features, a few words suffice to express the distinction between the two last-mentioned genera: *Natalia* has, like *Melianthus*, four stamens, two of which are quite free; *Bersama*, on the other hand, more strictly symmetrical in its structure, has its five stamens equally connected by the broad bases of their filaments.

Until now, while speaking of *Melianthus,* I have purposely restricted my observations to *Melianthus major* and *M. Himalayanus,* because they deviate in several important points from the structure of the two other Cape species, viz. *Melianthus minor,* L. and *Melianthus comosus,* Vahl: in these, the constant abortion of the fifth anterior (apparently posterior) petal, the total absence of any depression in that part of the receptacle which is inclosed by the gland, and of any lobes at either end of the capsule,—all these points concur with the striking peculiarities of facies, to point out the plants in question as types of an independent genus; the name of which, *Diplerisma,* will allude to the character of their free, lateral, subulate stipules, so very different from the wide, double, intrapetiolar stipule of the real *Melianthus.*

Having thus brought under a comparative review the four genera which constitute the order of *Meliantheæ,* we may conclude with some general inferences on their common relations to other groups; or, rather, we may establish upon proofs what has been anticipated above of their being equally removed from *Rutaceæ* and *Zygophylleæ,* while they are closely allied to *Sapindaceæ* on the one hand and to *Geraniaceæ* on the other.

First, although the sagacious and profound A. Laur. de Jussieu had connected, under the common name of *Rutaceæ,* the genera which Mr. Robert Brown distributed afterwards into the independent orders of *Zygophylleæ* and *Diosmeæ,* it strikes me that those orders belong to natural classes truly bordering on each other, but quite distinct. On one side, *Diosmeæ* (including *Ruteæ, Diosmeæ* proper, *Xanthoxyleæ* and *Aurantiaceæ*) form, with *Simarubeæ* and *Meliaceæ,* a vast and indivisible class; on the other side, *Zygophylleæ, Oxalideæ, Connaraceæ, Leguminosæ* and *Moringeæ* are connected by so many points of structure and habit, that they offer, in my humble opinion, a rare example of a well-marked and at the same time complete natural group; where the constant tendency of the folioles of the compound leaf to periodical sleep, or sometimes to sudden motion under an irritating influence, is always connected with that important structural fact, the articulation of the foliole with the stipes on which it moves. *Sapindaceæ* do not seem to me to belong to the first class, any more than *Geraniaceæ* deserve to be united with *Oxalideæ,* although this last opinion is generally prevalent. In fact, the true spirit of improvement in science is not to submit tamely and blindly to received opinions, but to examine, with proper caution, the grounds upon which they stand. Now the result of such a labour will no doubt, in many cases, strike at the root of ideas to which age and custom give a strong colouring of truth, and which however are not the less really misunderstandings of nature. Thus, to quote the only example of that prejudice which belongs to my present subject, who does not follow Jussieu in considering *Acerinæ* as immediately connected with *Malpighiaceæ*? Yet neither habit nor characters, but merely a deceptive resemblance between the winged carpels of some *Malpighiaceæ* and those of *Acer*, is the ground on which that connexion is founded. Now while such a trifling circumstance, which is almost in all cases only of generic value, is there the object of an exclusive attention, the real signs of the affinity of *Acerinæ* with *Sapindaceæ* seem to have escaped notice. Of these marks the most important, because the most general, is the position of the disc between the stamens and the petals,—a character which may be observed in all *Sapindaceæ* (including *Hippocastaneæ*) as well as in *Tropæoleæ* (including *Limnantheæ*), and also in *Melianthеæ* and *Geraniaceæ*; that is to say, in all the orders which, with the addition of *Cochlospermeæ*, I consider as members of the same natural class.

Having thus traced the outline of the groups with which *Melianthеæ* may be compared, and having fixed the place of that order in the last-mentioned class, it remains to justify that opinion by more circumstantial details. First, as to the facies,—a new species of *Natalia* is so strikingly like some *Paulliniæ*, that I have alluded to that resemblance by giving it the specific name *Paullinioïdes*. Moreover, *Sapindaceæ* include poisonous plants, the leaves of several *Paulliniæ* and *Serjaniæ*, like those of the *Magoniæ*, being used to intoxicate fish; and among them the *Paullinia australis*, A. St. Hil., being suspected by M. Aug. de St. Hilaire to be the plant which communicated to the honey of the *Lecheguana* wasp the noxious effects which that distinguished traveller has related from his own perilous experience*. Now analogous properties may be supposed to exist in *Melianthus*, judging from the strong narcotic and virous smell of the whole plant; and even a like induction might perhaps make us extend the suspicion to many of the *Geraniaceæ*. As to floral characters, the contrast of the quaternary proportion of the

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* See Aug. de St. Hilaire in Mémoires du Mus., vol. xii. p. 293.

stamens and petals with the quinary division of the calyx is equally striking in *Diplerisma* and *Natalia* among *Melianthææ*, and in *Paullinia, Serjania* and other *Sapindaceæ*; the cohesion of two of the calycine segments takes place in several *Serjaniæ* and *Paulliniæ* as well as in *Natalia*; the excentricity of the floral organs is the same in all these cases; the disc is obliquely unequal and incomplete; moreover, as the petals of many *Sapindaceæ* have on the inner side of their claws a lamelliform or crest-shaped appendage, so we find occasionally on the apex of the claws of the petals of *Natalia Paullinioïdes*, Planch., some fleshy tubercles, which are evidently the rudiment of a corresponding crest; and, lastly, as nothing can be more striking than the resemblance and general agreement of the capsule of *Diplerisma* with that of *Cardiospermum*, so, on the other hand, the coriaceous capsule of *Bersameæ*, with its arillate seeds, single in each cell, and ascending from the base of its inner angle, corresponds in all respects with the fruit of *Paullinia*. Thus the most important points of structure concur in proving the close connexion of *Melianthææ* with *Sapindaceæ*.

The analogy of floral organization which exists between *Melianthus* and *Polygala* is too obvious to be totally neglected, although the balance is rather against an immediate approximation of those plants. In both cases we have a remarkably irregular calyx, cut into five segments; the petals connected by their claws, and the stamens in a quaternary proportion. But here, as everywhere else, care must be taken not to confound floral analogy with real signs of immediate connexion; not to mistake parallelism of structure for that direct tendency which habit, the true touchstone of affinities, points out more or less clearly from one natural group to another. Now, it is on the combined suggestions of that general resemblance and of particular links of connexion, such as that of *Krameria* with *Janusia*, of *Securidaca* with *Acridocarpus* and *Hiptage*, it is, I say, upon these grounds that I am inclined to consider the affinity of *Polygaleæ* with *Malpighiaceæ* as more close than that of each of those orders separately with *Sapindaceæ* and *Melianthææ*. Still, however, these groups cannot be far removed from each other.

Besides the four genera which rank naturally under the first of these groups, another anomalous Cape genus may, according to Mr. Harvey's suggestion, be conveniently placed near them. The plant I allude to is *Aitonia*, whose habit is rather that of a *Lycium*; its leaves simple, fasciculated, and without stipules; its flowers solitary; its embryo evidently curved, and including, according to Mr. Harvey, on its concave side a small quantity of albumen,—all characters which militate against so close a connexion with *Meliantheæ* as other points of structure, and especially that of the fruit, are calculated to suggest.

Meliantheæ, as defined above, might be said to be an exclusively African tribe, if the existence of *Melianthus Himalayanus*, Wall., in the mountains of Northern India did not contradict so general an assertion. As no species of *Melianthus* has been observed in the intermediate regions between the Cape and the Himalaya, we may truly wonder, as Dr. Lindley observes, at the unexpected distribution of the genus; but that very fact must guard us against the danger of hastening to draw general inferences upon the geographical distribution of plants, since the only satisfactory results of that most important study must proceed from the careful limitation of the orders, tribes, genera, subgenera and species, from a knowledge of their mutual affinities, in short, from an analytic, comparative and comprehensive view of the immense sphere of vegetable creation. What I have to offer upon that point, in this particular case, is but a mite compared with the mass of the work; but, as it is, I have summed it up in the following synoptical table, which is the anticipated result of the systematical part of this paper.

Synoptical Table of the Geographical Distribution of MELIANTHEÆ.

	Sect. Eumeliantheæ.		*Sect.* Bersameæ.	
	Melianthus.	*Diplerisma.*	*Natalia.*	*Bersama.*
Cape of Good Hope . .	M. major	D. minor. D. comosa.		
Port Natal, (Subtrop. S.E. Africa.)	. . . .	. . . .	N. lucida.	
Sierra Leone, (Trop. W. Africa.)	. . . .	. . . .	N. Paullinioïdes.	
Abyssinia	. . . .	. . . .	. . . .	B. Abyssinica. B. serrata.
Kamaon, (Subtrop. N. India.)	M. Himalayanus.			
No. of species of each genus	2	2	2	2

Revisio Systematica Ordinis Melianthearum.

Ord. MELIANTHEÆ, *Planch.*

Genus (*Melianthus*) familiæ Geraniorum, *Adans. Fam. Pl.* ii. p. 388 (ann. 1763).—Genera in ordine enumerata: *Malpighia*, *Banisteria* (Malpighiaceæ); *Tropæolum* (Tropæoleæ); *Serjania*, *Paullinia*, *Cardiospermum* (genera Sapindacea sub nomine *Corindi*, Tourn., ab auctore in unum confusa); *Melianthus* (Meliantheæ); *Geranium* (Geraniaceæ); *Hermannia*, *Melochia* (Büttneriaceæ-Hermanniaceæ); *Viola* (Violaceæ).

Genus (*Melianthus*) Rutaceis affine, *Juss. Gen.* p. 297 (ann. 1789).—Genera in ordine enumerata: sectionis primæ, *Tribulus*, *Fagonia*, *Zygophyllum*, *Guaiacum* (Zygophylleæ, *Br.*); sectionis secundæ, *Ruta*, *Peganum*, *Dictamnus* (Rutaceæ-Ruteæ, *Adr. Juss.*); genera affinia, *Melianthus* (in annotatione cum *Dictamno* et *Tropæolo* comparatus) (Meliantheæ), *Diosma*, *Empleurum* (Rutaceæ-Diosmeæ, *Adr. Juss.*), *Aruba* (Simarubeæ, *Rich.*).

Genus (*Melianthus*) ordinis Corydalium, *Linn. Prælect. in Ord. Nat.* p. 371 (ed. Giseck. ann. 1792).—Genera enumerata: *Melianthus* (Meliantheæ), *Monniera* (Rutaceæ-Diosmeæ, *Adr. Juss.*), *Epimedium* (Berberideæ, *Juss.*), *Hypecoum*, *Fumaria* (Papaveraceæ, *Juss.*), *Leontice* (Berberideæ, *Juss.*), *Impatiens* (Balsamineæ, *Ach. Rich.*), *Utricularia* (Lentibularieæ, *Rich.*), *Calceolaria* (cum ?) (Scrophularineæ, *Juss.*), *Pinguicula* (Lentibularieæ, *Rich.*).

Genus (*Melianthus*) Rutaceis-Zygophylleis affine, *Adr. Juss. Mém. Rut.* p. 76 (ann. 1825); *Endlich. Gen.* No. 6043 (nomine ordinali *Meliantheæ* adjecto, sed absque definitione, nec genus cum ullo alio consociatum).

Genus (*Melianthus*) Sapindacearum, *Reichenb.* ex *Steud.*

Genus (*Bersama*) Ampelideis dubitanter adscriptum, *Endlich. Gen.* No. 4572 (ann. 1836–1840).

Genera (*Bersama* et *Natalia*) Sapindacearum, *Hochst. in Flor. Ratisb.* (ann. 1843) ii. p. 663.

Genus (*Bersama*) Meliacearum, *Ach. Rich. Tentam. Flor. Abyss.* i. p. 107 (ann. 1847).

CHAR. ORD. *Flores* hermaphroditi (an interdum polygami?), plùs minùs irregulares. *Calyx* 5-partitus, laciniâ impari posticâ, omnibus æstivatione quincunciatim imbricatis.

Petala 4–5, laciniis calycinis alterna, unguiculata, nuda v. intùs ad unguis apicem tuberculis carnosis minutis interdùm aucta.

Stamina 4–5, petalis alterna; *filamentis* crassis; *antheris* supra basin dorso affixis, bilocularibus, loculis connectivo dorsali intùs adnatis rimâ introrsâ dehiscentibus.

Discus inter petala et stamina positus, sæpiùs hippocrepiformis, nunc incompletè annularis.

Ovarium 4–5-loculare. *Stylus* plùs minùs crassè subulatus, dentibus v. lobis 4–5 *stigmaticis* terminatus. *Ovula* in loculo singulo 2–4, biseriata, supra medium anguli interni affixa, horizontalia v. adscendentia, nunc solitaria et e basi anguli interni adscendentia.

Capsula loculicidè 4–5-valvis (dehiscentia tamen non semper secus dorsum carpelli extensa).

Semina (fertilia) in loculis solitaria; *testâ* crustaceâ; *albumine* copioso, subcorneo; *embryonis* axilis recti *radiculâ* hilo admotâ, lineari-clavatâ; *cotyledonibus* lineari-ellipticis, crassiusculis, facie planâ sibi invicem applicitis longiore.

Frutices *sempervirentes,* gemmis *squamosis destituti.* Folia *alterna v. subopposita, imparipinnata,* petiolo *sæpiùs inter foliola alato v. marginato.* Stipulæ 2, *in unam intra-axillarem sæpiùs concretæ, nunc laterales et liberæ.* Racemi *terminales et axillares.*

Trib. I. EUMELIANTHEÆ.

Flores sub anthesi, ob pedicelli torsionem, resupinati. *Calyx* magnus, conspicuè irregularis, laciniis inter se non concretis. *Petala* calyce minora (evidenter perigyna), 4 superiorum (nempe 2 posticorum et 2 lateralium) *unguibus* conniventibus et mediante indumento lanuginoso sursùm inter se cohærentibus (nec verè concretis). *Filamenta* staminum 2 (reverâ lateralium, sed ex facie posticorum) unâ cum rudimento staminis postici semper abortivi nunc planè deficientis, basi concreta. *Ovarium* 4-loculare, *loculis* 2–4-ovulatis; *ovulis* supra medium anguli interni affixis, horizontalibus v. adscendentibus, biseriatis. Denticuli *stigmatici* minuti. *Capsula* papyracea, subtetraptera, carpellis (abortu) monospermis (*fide Ad. Juss.*), secus dorsum haud dehiscentibus. *Semina* exarillata.

Racemi *bracteosi.* Flores *nutantes.* Odor *virosus, fœtidus.*

Gen. 1. MELIANTHUS, *Tournef.*

Melianthi sp., L. et Auct. subseq.

CHAR. DIFF. *Calyx* hinc (versus latus reverâ posticum sed in flore resupinato ex facie anticum) in gibbum subscrotiformem intùs cavum productus. *Petala* 5, antico abortivo. *Capsula* apice 4-loba, lobis suturâ internâ dehiscentibus.

Folia *glaberrima, glauca.* Stipulæ *in unam intra-axillarem petiolo infernè adnatam magnam concretæ.*

OBS. In pluribus floribus specierum infrà enumeratarum ovarii septa semper completa et ad axim inter se concreta vidi; Cl. Ad. de Jussieu, contrà, ovarium *M. majoris* supernè incompletè septatum descripsit et delineavit. An ideò character illud inconstans? An stirps quæ Cl. auctori in hortis innotuit a vero *M. majore*, L., specificè diversa?

Sp. 1. *Melianthus major*, L.—M. petalorum laminis densè pubescentibus.

α. Gibbo calycis conspicuo, subscrotiformi.

Melianthus major, *L. sp.* ii. p. 892, *et Herb.*! *Sims, Bot. Mag.* tab. 45.

β. Gibbo calycis obtusissimo et lato vix conspicuo. An sp. distincta? sed foliis deficientibus, ibi non definienda.

Hab. Ubique in cultis coloniæ Capensis; ex *Eckl. et Zeyh.* Varietatem β. prope Cape Town legit *cl. Hook. fil.*

Sp. 2. *M. Himalayanus*, Wall.—M. petalorum unguibus glabris.

M. Himalayanus, *Wall. Cat.* No. 1190.

Hab. In Indiæ superioris ditione Kamaon (Vid. sicc. in herbb. Soc. Linn. Lond. et Lindl.).

Gen. II. DIPLERISMA.

Melianthi sp., L. et Auct. subseq.

CHAR. DIFF. *Calyx* nec conspicuè gibbosus nec intùs intra aream a disco limitatam excavatus. *Petali* antici ne quidem rudimentum. *Capsula* utrinque obtusa, vix ac ne vix 4-loba.

Rami foliaque *præsertim subtùs pube adpressâ canescentes.* Stipulæ 2, *subulatæ, laterales, liberæ.*

Sp. 1. *Diplerisma minus*, Planch.—Melianthus minor, *L.*; *Vahl, Symb.* iii. p. 85.

Hab. In Coloniæ Capensis provinciis occidentalibus, maritimis. Saldanha Bay, prope Compost, *Thunb.*—Langevaley, district. Clanwilliam, versus littus maris, lat. circit. 32° 30′, infra altit. 1000 ped., *Drège in Herb. Hook.*

Petalorum laminæ basi utrinque ligulâ lineari auctæ.

Sp. 2. *D. comosum*, Planch.—Melianthus comosus, *Vahl, l. c.*

Hab. In Coloniâ Capensi; Langevaley, in Carro infra Bockland et alibi, *Thunb.*; Zuureberg, dist. Albany, *Burke in Herb. Hook.*; Graafreynet, in scopulosis et petrosis montanis, alt. 3000–4000 ped., August, *Drège*, No. 7716. Ad ripam arenosam fluminis Camtoursrivier, distr. Uitenhage, tùm in lateribus montium prope Philipstown (ceded territory), *Eckl. et Zeyh. Enumer.*

Trib. II. BERSAMEÆ.

Flores non resupinati. *Calyx* haud magnus, nec conspicuè irregularis, laciniis 2 anticis inter se plùs minùs concretis. *Petala* 5, calyce majora, antico cæteris paullò angustiore, omnia libera et subæquidistantia, crassa. *Stamina* 4–5. *Ovarium* 4–5-loculare, loculis

1-ovulatis; *ovulis* e basi anguli interni adscendentibus. *Lobi stigmatici* 4-5, crassi, in conum approximati. *Capsula* coriacea, ab apice ferè ad basin imam in valvas 4–5 medio septiferas dehiscens. *Semina* arillo cupuliformi, carnoso, testæ adnato prædita.

Bracteæ *minutæ*. Flores *patentes v. nutantes*.

Gen. III. NATALIA, *Hochst. in Florâ, ann.* 1841, p. 663 (partibus anticis floris perperam posticis dictis et vice versâ).

Rhaganus, E. Mey. Mscr. in coll. Drèg. (ut cl. Bentham me monitum fecit).

Genus novum Sapindaceum, Bentham in Herb. olim et in litt. ad cl. Harvey.

CHAR. DIFF. *Stamina* 4, antica 2 (reverâ lateralia, sed ob antici staminis defectum hujus sedem pro parte usurpantia), basibus dilatatis filamentorum concreta.

OBS. Discum dimidiatum staminibus duobus posticis adjacentem in specie utrâque observavi.

Sp. 1. *Natalia lucens,* Hochst. l. c.—*Rhaganus lucida,* E. Mey.

Hab. In Africæ Australis subtropicæ orâ orientali, ad Port Natal, *Krauss.*, No. 71; *Drège in Herb. Hook.*; *Peddie in Herb. Benth.*

Sp. 2. *N. Paulliniöides,* Planch. in Hook. Icon. Pl. tab. 780.

Hab. In Sierra Leone, *Vogel in Herb. Hook.*

Gen. IV. BERSAMA, *Fres. in Mus. Senck.* ii. 280. *ex Endl. Gen.* No. 4572.

Sp. 1. *B. Abyssinica,* Fres. l. c. ex Ach. Rich.—Bersama integrifolia, *Ach. Rich. Tentam. Fl. Abyss.* i. p. 107. tab. xxvi.

Hab. In prov. Chiré, Abyssiniæ, *Quartin Dillon,* ex *Ach. Rich.*, et etiam in regione mediâ montis Sellenda, *Schimper* ex *Ach. Rich.*; sed specimina *Schimperiana* ex eâ regione quæ in Herb. Hook. vidi, ad speciem subsequentem referenda. In illis enim stylus longè exsertus et discus ferè completè annularis, dum in icone stirpis *Dillonianæ* stylus inclusus et discus dimidiatus apparent.

Sp. 2. *B. serrata,* Ach. Rich. l. c.

Hab. In collibus prov. Ouodgérate Abyssiniæ, *Ant. Petit.* ex *Ach. Rich.*; et in monte Sellenda, si specimina *Schimperiana,* No. 942 (sect. 2dæ) hùc rectè relata.

OBS. Specimen *Schimperianum,* No. 1507 (sect. 3dæ) differt a suprà dicto (No. 942), fructibus conspicuè minoribus, vix pulveraceo-cinereis, nec rufo-pubescentibus. Flores etiam, quorum fragmenta tantùm vidi, minores esse et ad illos *Bersamæ Abyssinicæ,* Fresen. (fide Ach. Rich.) accedere videntur; tamen, ob exsertionem styli, et discum ferè completè annuliformem diversi. Cæterùm differentias longitudinis styli et staminum potiùs polygamiam florum quam veras notas specificas denotare valdè suspicor, quum

in floribus omnibus stylo exserto præditis (qui tantùm mihi suppeterant) pollen in antheris frustrâ quæsivi. An igitur reverâ plus quam una species?

EXPLANATION OF PLATE XX.

Fig. 1. A flower of *Melianthus Himalayanus,* Wall.

Fig. 2. The same, with half of the calycine segments removed.

Fig. 3. The four posterior petals inserted round the concave glandular disc, with part of the receptacle which supports both petals and disc.

Fig. 4. Flowers of *Melianthus major,* β.

Fig. 5. The same, with half of the calycine segments removed.

Fig. 6. The half of the posterior part of the calyx, and gland.

Fig. 7. The four posterior petals around the disc:—side view.

Figs. 8 & 9. Two different forms of the fifth anterior abortive petal.

Fig. 10. The fruit of *Melianthus major,* α.:—natural size.

Figs. 11, 12, 13. Seed and embryo of the same:—copied from M. Ad. de Jussieu's memoir on *Rutaceæ.*

Fig. 14. A flower of *Diplerisma minus.*

Fig. 15. One of its lateral petals.

Fig. 16. A flower of *Diplerisma comosum.*

Fig. 17. The same, after the cutting off of the posterior and one of the lateral and anterior calycine segments.

Fig. 18. Ovarium of *Diplerisma comosum,* with one of its cells cut open.

Fig. 19. Diagram of *Diplerisma comosum*; c', posterior calycine segment; c, c, c, c, other calycine segments; p, p, p, p, petals; d, disc; s, s, s, s, stamens; o, ovarium.

Fig. 20. The fruit of *Diplerisma minus*:—natural size.

Fig. 21. A flower of *Natalia Paullinioïdes.*

Fig. 22. Internal organs, and one of the posterior petals of the same.

Fig. 23. Disc.

Fig. 24. A flower of *Bersama Abyssinica.*

Fig. 25. The same, after the removal of the petals and the forcible expansion of the calyx.

Fig. 26. The capsule of *Bersama Abyssinica.*

Figs. 27 & 28. Seed and embryo of *Bersama integrifolia,* Rich.:—copied from Ach. Richard's *Tent. Fl. Abyss.*

Obs. All the parts are more or less magnified, except when the contrary is stated.